Wind Energy Development Guidelines

Arizona Game and Fish Department, Habitat Branch

July 2006

Introduction

The Arizona Game and Fish Department supports the development of wind energy as a viable source of clean and renewable energy. Although wind-generated electrical energy is environmentally friendly as it does not create air-polluting and climate-modifying emissions, wind turbines, in particular the large arrays needed for commercial electricity generation, can have significant impacts on wildlife and wildlife habitats. With proper site placement, project and turbine design or associated structures, the impact to local and migrating wildlife populations can be minimized. The Department offers the following recommendations for minimizing potential impacts to wildlife and their habitats.

Pre-Construction

1. A three-year baseline survey to assess the level of impact to wildlife (local and migrating populations) and their habitats. Conduct surveys at various times of the year to assess breeding, wintering, and migrating wildlife use (raptors, bats, songbirds, etc.).
    a. Avoid developing in areas of high-density breeding or wintering raptors, in high wildlife use areas, or in migration corridors.
2. During planning and development of your project, create an Invasive Species Management Plan to address potential impacts from the introduction or spread of invasive species. Invasive species can be plants, animals, and other organisms (e.g., microbes) by which human actions are the primary means of introducing.
3. Wind Towers on private property should consider entering into a Habitat Conservation Plan with the U.S. Fish and Wildlife Service for the possibility of violating the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

Site Placement

- Maximize use of flat land and gentle slopes.
- Ridges, steep slopes, valleys, canyons, cliffs, and fissures are usually areas of concentrated wildlife, generally birds and bats.
- When ridges, canyons, cliffs, and fissures are within the project vicinity, offset the turbines at least 50 meters from the geologic features.
- Avoid placing strings or clusters of towers close to prairie dog colonies.

Habitat Fragmentation

- Minimize the number of new roads constructed.
- Close and rehabilitate any unnecessary roads after completion of the project. Roads and rights-of-way that provide access to critical wildlife habitat should be designed for easy and effective closure. Gates should be installed at onset of construction and closed immediately after completion of the project. Temporary roads should be obliterated and revegetated immediately after construction.
- Maximize use of existing corridors and roads.
- If possible, use agriculture lands or other disturbed areas.

Power Transmission

- Use underground power lines when possible.
- See Trenching Guidelines for more information.
- Use raptor protective devices on above ground wires.

Tower Configuration

- Use cluster and/or string designs to reduce gaps. Towers in groups or strings cause fewer mortalities than lone towers. Perhaps due to the visual disturbance causing raptors and birds to fly around the wind farm as opposed to flying through it.
- Minimize or eliminate single towers or cluster designs less than 4 towers.
- Add non-bladed pylons at the ends of large cluster strings. Increased mortality occurs at string ends. By placing less lethal structures at the ends, birds are more likely to fly around the strings without incident.

Tower Design

- Unless site-specific key species behavioral observations indicate more optimal tower and blade dimensions, use tubular towers with lower blade reaches higher than 100 feet and upper blade reaches less than 400 feet tall.
- Utilize the minimum blade rpm. Consider reducing the blade rpm during spring and fall bird migration, and nights.
- Minimize lattice towers with guy wires and use bird flight diverters when guy wires are necessary.
- White strobe lights no more than 24 pulses/minute with a longer "off" phase between the flash phases of the light pulses. Birds are less likely to be attracted to this type of lighting.
- Paint the ends of the blades to minimize motion smear.
- Avoid riprap around towers. Debris piles invite a variety of prey species into an area, which attract raptors.

Construction

1. Staging areas and construction sites should be located in previously disturbed areas and revegetated with native species that approximate pre-disturbance plant community composition, as all efforts should be made to minimize impacts on vegetative communities.
2. Develop measures to minimize potential wildlife impacts as a result of ditch excavation. These measures may include the addition of escape ramps in the ditch and/or mesh fencing along the perimeter to deter smaller mammals and herpetofauna (snakes, lizards, turtles, tortoise) from entering or being unable to escape. In addition, development of a monitoring schedule for each segment of the underground power line installation would further ensure minimizing potential impacts to wildlife. See Trenching Guidelines for more information.
3. Follow existing disturbed areas during installation to minimize habitat alterations. When disturbed areas are not an option, high quality habitat should be avoided and any altered areas should be returned to the original grade and revegetated following construction. In low areas where the power line crosses drainages, the soil should be compacted to reduce the potential for erosion.
4. Coordinate project activities and construction throughout the year to minimize disturbance to breeding birds. Breeding seasons vary greatly amongst bird species in Arizona. Develop a construction plan to avoid disturbance during nesting season.
5. Avoid removal of deadfall/snags since many bat species use snags for maternity roosts.
6. Coordinate plant salvage efforts with the Arizona Department of Agriculture, in accordance with the Arizona Native Plant Law. In addition, the applicable land management agencies should be consulted regarding guidelines for revegetation efforts.

Post-Construction

1. A three-year monitoring plan should be developed to assess movement, mortality, behavior changes, and abundance of local species. This information may be used in future facility design modifications to reduce wildlife mortality and to allow for movement of wildlife in appropriate locations
2. Control noxious weeds using approved herbicides.
3. Eliminate use of rodenticides to reduce concentrations of rodent populations on the perimeter of the facility.
4. Current research recommends development of a Fire Management Plan.

For additional information, please refer to the U.S. Fish and Wildlife Service's guidelines on wind energy development, published as Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines (Federal Register: July 10, 2003. Volume 68, Number 132.) http://www.fws.gov/habitatconservation/wind.htm. In addition to these guidelines, the Department recommends referring to our Trenching and Powerline Guidelines, as well as the standard Arizona Heritage Data Management System (HDMS) list of special status species.